

## SUMMARY OF POTENTIAL SENSITIVITY ANALYSES

Revised December 15, 2003; Based on E&O Workgroup Discussion

Scenario	Description	Analyses to be Performed	Models to be Used	Status	Resource Actions addressed by Scenario
	<b>Benchmark Study (Existing Conditions):</b> This scenario uses the current level-of-development hydrology as well as the current regulatory framework (which includes the existing biological opinions for steelhead and spring-run chinook salmon).	This scenario is the basis for comparing all other operational scenarios.	CALSIM II HYDROPS WQRRS HEC-RAS	Completed Near Completion Completed Completed	
	<b>Benchmark Study (Future Conditions):</b> This scenario uses the future level-of-development hydrology as well as the current regulatory framework (which includes the existing biological opinions for steelhead and spring-run chinook salmon).	This scenario is the basis for comparing all other operational scenarios. O&M to review the OCAP version and analyse the need and addition of future projects.	CALSIM II HYDROPS WQRRS HEC-RAS	Near Completion – – Completed	
1	<b>Eliminate pump-back operations:</b> This scenario is the same as the Benchmark scenario except pump-back operations are eliminated to test estimate the effects that of pump-back would have on water temperatures in Thermalito Afterbay and the Feather River.		HYDROPS WQRRS	Completed Near Completion	EWG-35, EWG-83, EWG-87
2	<b>Eliminate pump-back and peaking operations:</b> In addition to eliminating pump-back operation, this scenario also “flattens” the generation pattern – no peaking of the generation – May through September to test effects that peaking would have on water temperatures in Thermalito Afterbay and the Feather River.		HYDROPS WQRRS	Near Completion –	EWG-35, EWG-83, EWG-87
3	<b>Minimize the water surface fluctuation in the Thermalito Afterbay during bass and waterfowl nesting periods:</b> This scenario is the same as the Benchmark scenario except water surface fluctuations in the TAB are minimized from March through June. Two specific model runs would be analyzed; one with no fluctuation and the other with minor fluctuation in water surface.	Perform desktop analyses to look at how contingency operations are impacted by this action.	HYDROPS WQRRS		EWG-28

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4	<b>Maintain a constant water surface fluctuation in the Thermalito Afterbay during bass and waterfowl nesting periods:</b> This scenario is the same as the Benchmark scenario except water surface in the TAB is required to fluctuate each day for the period March through June. Two specific model runs would be analyzed.	Perform desktop analyses to look at how contingency operations are impacted by this action.	HYDROPS WQRRS		EWG-28
5	<b>Eliminate the Fish Hatchery temperature requirement as a control for Oroville Dam operations:</b> This scenario assumes the Fish Hatchery water can be cooled by a means independent of the source water temperature; thus, it does not impact decisions on facility and river temperatures.		HYDROPS WQRRS		EWG-35, EWG-36, EWG-37, EWG-38, EWG-83, EWG-87
6	<b>Increase minimum release to low flow section:</b> This scenario is the same as the Benchmark Scenario except the release to the Low-Flow section of the Feather River will be increased (value to be determined from fisheries studies) during the key spawning and rearing period (June through December).	This requires setting a constraint exception for releases to the low flow channel for part of the year. Similar to Scenario 22. Increases in increments of 1500, 2000 and 4000 cfs are being done	HYDROPS WQRRS	In Progress	EWG-3, EWG-88
7	<b>Gradual flow increase for spawning:</b> This scenario is the same as the Benchmark Scenario except the release to the low flow section of the Feather River will be increased and held during the key spawning and rearing periods in the fall. Once the flow is ramped to the desired level, it will be maintained until the larval fish emerge from the gravel (April?). This scenario would be based upon the Benchmark scenario, but may require re-run of CALSIM II if ramped Low-Flow section releases exceed the total release prescribed in the CALSIM II Benchmark.	This requires setting a new constraint exception for releases to the low flow channel for part of the year. Flows to consider: 1000, 1500, 2000.	CALSIM II HYDROPS WQRRS	Modeling Plan has been drafted and staff is beginning to work on data preparation.	EWG-15A, EWG-15B

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10	<b>Impose various water temperature requirements (60°F and 65°F) at various locations along the river (Robinson Riffle, Thermalito Outlet, Honcut Creek, etc.):</b> This scenario attempts to meet the water supply needs prescribed from the CALSIM II benchmark scenario while adjusting Oroville Facilities operations to achieve the temperature objective from June through September. CALSIM II would be re-run as needed to investigate potential water supply effects.		CALSIM II (if needed)  HYDROPS  WQRRS		EWG-36, EWG-37, EWG-38
12	<b>Impose a 9-foot per month drawdown limit on Lake Oroville:</b> Reservoir level would be allowed to drop 9 feet per month from March through June. Review of Existing Conditions Benchmark indicates that there will be a problem in many June's.	Review water supply and available export capacity impacts from CALSIM II	CALSIM II <del>HYDROPS</del> <del>WQRRS</del>		EWG-30
13	<b>WATER SUPPLY IMPACT ON LAKE OROVILLE WATER LEVELS:</b> This set of scenarios is to evaluate how sensitive Oroville lake levels are to varying levels of SWP demands. The SWP demands will be set at 0, 1.0, 2.0, 3.0, and full Table A (4.2) levels.		CALSIM II	Completed	None
14	<b>Investigate the effects of providing additional flood reservation:</b> The approach would be to perform reservoir routing analysis for additional flood reservation conditions. Operations models would be used to investigate impacts to other resource areas.		CALSIM II HYDROPS WQRRS ResSim		None

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15	<b>Construct channel to carry water around TAB:</b> Same as the Benchmark Scenario but this scenario includes a channel that leads from the Thermalito Power Plant to the afterbay near the Feather River outlet. This would allow water to reside longer in the afterbay before being diverted by Western or Sutter Mutual.	WQRRS can not model this as stated. Would require development of some other analysis technique.	Desktop Analysis	Completed	EO1
17	<b>Investigate the extent of temperature control from the Oroville Facilities:</b> This is a sensitivity analysis (see SP-E6) of how far downstream from the Oroville Facilities that water temperature can be controlled.		WQRRS	Completed	EWG-83
18	<b>Hold Thermalito Afterbay at a minimal water level:</b> This scenario is to investigate the effect that water volume has on afterbay water temperatures during the spring.	WQRRS, Post-process Benchmark to get new storage for each hour	HYDROPS WQRRS		EWG-87
19	<b>Investigate the impacts of power economics on power production:</b> This is a sensitivity analysis to see how changes in power economic assumptions affect peaking and pumpback power operations.		HYDROPS WQRRS		
20	<b>Limit pump-back operations:</b> The benchmark scenario is designed to optimize pump-back operations. Thus, there will be times when it will utilize pump-back to a greater degree than observed in actual operations. Another model scenario (#1) sets pump-back to zero. This model scenario will all pump-back operations to occur; the goal is to model pump-back levels that are near the levels observed historically.		HYDROPS WQRRS	Near Completion	

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21	<b>Winter water temperature sensitivity analysis:</b> This is a sensitivity analysis to investigate the extent of temperature control in the river downstream of the Oroville Facilities during the spring period.	Similar approach as Scenario 17. Analysis starts in Feather River just below afterbay. Factors to analyze include ambient temperature, water temperature, and flow.	WQRRS		EWG-87
22	<b>Release additional flow to low flow section:</b> Releases from the TAB would be curtailed from (could be all year, but most likely May through December). During that period, water would be released to the river at the Diversion Dam. The purpose of this scenario is to evaluate (1) the effect of residence time on water temperatures in the afterbay and (2) the effect of water temperatures and attraction flows on fall spawning and rearing.	Details on performing model runs to be determine. Discharge rates to the low flow channel may vary up to 4000 cfs. Increments include 1000, 1500, 2000 and 4000 cfs. Most likely, the scenario would be completed as a series of sensitivity runs.	HYDROPS  WQRRS	In Progress	EWG-35, EWG-36, EWG-37, EWG-38, EWG-83, EWG-87